November 5, 1999

Carole Washburn, Secretary
Washington Utilities and Transportation Commission
PO Box 47250
Olympia, WA 98504-7250

Subject: Docket No. UE-991168 — Electric System Reliability - Rulemaking

Dear Ms. Washburn,

The CTED Energy Policy Group (CTED) is pleased to submit these comments regarding electricity distribution system reliability in response to the Commission's Notice of Opportunity to File Written Comments. As the scope of the Commission's inquiry is at this point quite broad, CTED's comments will focus on a few broad ideas and principles for the Commission to consider when deciding what further action to take in this area.

Background

Reliability is valuable. Power interruptions and power quality problems impose costs on society by interrupting the normal flow of commerce and, in some instances, disrupting the provision of vital services such as home heating or medical care. But achieving higher reliability can also be costly. It requires the installation of new facilities such as power lines, transformers, and other electric equipment. Good public policy and effective utility regulation should seek to balance the costs and benefits of achieving additional increments of reliability.

Reliable electric service can be disrupted as a result of problems with electricity generation (lack of adequate generating capacity to meet peak loads), transmission (disturbances on the high-voltage, interstate transmission grid), or distribution (interruptions and power quality problems due to conditions on the local distribution grid). The Commission should clarify whether it wishes to address the reliability of the distribution system only, or whether it shares the concerns of many around the region about whether there will be adequate generating capacity to meet peak load under critical conditions, and whether the transmission system can continue to be operated reliably in light of changes underway in wholesale power markets resulting from the Federal Energy Regulatory Commission's Orders 888 and 889.

These comments focus on the reliable operation of the distribution system only, though some of the discussion may also be applicable to other areas. Distribution system reliability has two elements: power interruptions and power quality. While these issues are not the same, problems in these two areas often coincide. Areas that are embedded within the main distribution grid tend to have both fewer interruptions and fewer power quality problems. Remote areas are subject to more power quality problems and more frequent and lengthier interruptions. Many investments provide both interruption and power quality benefits.

The distribution system should strive to provide appropriate reliability

In some senses, reliability is a classic "public good": collective investment enhances the reliability of large numbers of customers, none of whom can practically be prevented from enjoying the benefits of that investment. Traditional, collective utility investment with broad, regulated cost recovery is an appropriate mechanism for making these investments.

But there are some cases where the public good model breaks down. Some customers, such as high-tech manufacturers or telecommunications providers, have extraordinary needs for high-quality, extremely reliable power. Customers in remote, forested areas might be extremely expensive to serve with the same reliability as the customers in the center of a major city. Or some customers might simply have a lower tolerance for reliability problems than other, similarly situated customers.

In the first case, the beneficiary of the desired level of reliability is overwhelmingly a private entity, rather than the public at large. In the second case and third cases, providing a high level of reliability might not be cost-effective from a societal point of view, even though the individual customers may be willing to pay significantly more to enhance the reliability of their service. All cases might warrant some deviation from the traditional notion of collective utility investment and broad cost recovery.

These examples speak to the notion of "appropriate reliability". Appropriate reliability means first that a customer gets the reliability she pays for. That is, she is not required to pay for reliability investments that do not improve overall reliability. Second, it means that to the extent practicable, she is allowed to select — and pay for — her desired level of reliability. If electric reliability were like other services, customers could buy as much of it as they felt they wanted or needed depending on the price at which it was offered. Utility regulation should seek to mimic this function of the market by searching for innovative ways to incorporate customer reliability needs and willingness to pay into utility tariffs. At the very least, it should not inhibit a customer's ability to make an incremental investment to enhance the reliability of her service should she wish to do so.

Customer-based systems can help achieve appropriate reliability

While the "public good" nature of reliability makes individual investments in incremental reliability impractical in most cases, new technology is changing this equation by making devices based at the customer site, such as surge protectors and backup generation systems, increasingly affordable for all classes of customers.

Backup generation, whether net-metered or not, is becoming an increasingly attractive option for many customers. New, sophisticated balance-of-systems equipment can sense when the main grid is down, instantaneously open the circuit between the customer and the grid, and begin to draw current from battery banks, which can be recharged with propane generators, solar panels, wind turbines, or fuel cells. When the grid comes back up, the circuit is re-closed, and the customer is once again served by main grid power. This allows safe and seamless operation of home generating equipment for backup purposes.

The same equipment can practically eliminate normal, grid-induced voltage and frequency excursions, providing customers with higher quality power in addition to eliminating interruptions. Generation sources in remote areas also provide power quality benefits to the grid, mitigating problems with voltage drop, for example. Widespread adoption of distributed technology could even provide an additional peaking resource for the utility.

By definition, customer-based systems provide appropriate reliability. Customers will choose to invest in these systems only if they find that the benefits outweigh the costs. While cost remains a barrier for many customers, the market for this type of equipment is just beginning to develop, and costs can be expected to drop substantially over the next several years. The Commission may wish to investigate whether and how it can spur the development of the market for this type of equipment in Washington. Some actions it might take include:

- Adopting by rule any nationwide interconnection standards agreed to by national standard-setting bodies such as the Institute of Electrical and Electronic Engineers (IEEE);
- Prohibiting utilities from imposing onerous insurance requirements on customers who wish to install grid-connected backup systems, whether net-metered or not;
- Requiring utilities to provide information, referral, or even financing for grid-connected backup systems; and
- Requiring utilities to establish pilot programs to measure the reliability benefits of grid-connected backup systems.

The Commission might wish to open a separate docket to consider issues associated with distributed generation. This would allow the Commission to consider other issues that are not directly related to reliability including technology and equipment specifications, interconnection issues and how distributed generation will interact with the grid, implementation of the state's net metering law, and what type of consideration to give to distributed systems that are not eligible for net metering.

Collective investments should be made on a least-cost basis

While the developing market for backup systems is making reliability more and more an individual decision, many investments are still more appropriately made collectively. For these investments, least-cost planning principles should apply. Many local reliability problems could be solved by a variety of different types of investments, such as looping of distribution wires to provide redundancy, installation of regulating transformers, remote generation, load management, and energy conservation. The application of least-cost principles to reliability investments would help to ensure that only the most cost-effective investments are made, keeping costs low for consumers in the long run.

The Commission may also wish to consider the extent to which utility tariffs provide incentives or disincentives to make the least-cost investment to serve a specific geographic area. Traditional, postage-stamp tariffs allocate all costs on a system-wide basis, overlooking the fact that some areas are more expensive to serve than others, and that some areas receive much more reliable service than others. This requires all potential system upgrades to meet a strict, system-wide cost-benefit test, even if customers in the affected area are willing to pay more for the increased reliability the upgrade would provide.

The Commission already allows direct assignment of reliability investments in the case of under grounding of transmission and distribution lines. The Commission could consider establishing special "reliability zones", in which local areas with reliability needs that do not meet a societal cost-benefit test could opt to fund incremental investments. Other utilities are already moving in this direction; in its current rate case, Seattle City Light is proposing a reliability surcharge on customers in its downtown core because of the expense of maintaining highly reliable, redundant systems in that area.

For problems of power quality, the utility system should be expected to perform according to the most broadly-based expectations of grid power quality. Both customers and the manufacturers of equipment that is potentially sensitive to power quality have the responsibility to anticipate normal, unavoidable power quality problems and to take appropriate prophylactic action. Because the relevant market for manufacturers of these products encompasses at least the entire United States, Washington standards for power quality should be similar to those applied to utilities across the country.

It is impossible for a utility to guarantee that no customer's equipment will ever be damaged due to power quality problems. In order to minimize the possibility of any damage to customer-owned equipment owned, the Commission could require utilities to provide better information about potential power quality problems, including referral to local vendors of protective equipment.

Better reliability metrics are needed

It will be difficult for the Commission to be satisfied of the need for extensive new reliability programs without a quantitative demonstration that the benefits of the programs outweigh the costs. Other stakeholders have commented that there does not appear to be a widespread problem with reliability or power quality at this time. However, the current lack of consistent measures of reliability, both across utilities and through time, makes it impossible to assess the reliability of existing utility service and, hence, the benefits of any new activities.

Broad, system-wide metrics such as SAIDI (system average interruption duration index) and SAIFI (system average interruption frequency index) could be useful for the Commission and other interested parties to get an overall picture of the performance of a utility's system. However, reliability frequently depends on local geography. For instance, preventing outages is more difficult in areas that are heavily forested, or on islands or peninsulas where geography prevents looping of distribution lines. It may also be more difficult to maintain consistent voltage in these areas. Accounting for the effects of weather also raises a potentially enormous challenge in properly interpreting reliability statistics.

For these and other reasons, broad reliability metrics may be most useful not for comparison with other utilities, but rather as a benchmark against which to measure both the performance of each utility over time and the performance in specific geographic areas within the utility's service territory. Grid-wide statistics will not reveal much by themselves, but could be instrumental in identifying areas where reliability is a chronic problem. After an unusual number of customer complaints, the Commission might require the utility to measure reliability in a specific area for a period of time, and compare the result to the company-wide measures, with a large enough deviance requiring the utility to take some corrective action. After some experience has been developed with the application of these types of metrics, the Commission could consider whether they would appropriate to incorporate into utility performance agreements.

Summary and Conclusion

CTED thanks the Commission for the opportunity to comment on distribution system reliability and power quality issues. Reliability is valuable, but achieving it can be costly. Effective utility regulation should seek to balance the costs and benefits of achieving additional increments of reliability. Most reliability investments are appropriately made collectively, with broad cost recovery. These investments should be made on a least-cost basis. However, new technologies are making it possible for customers to invest in systems that provide either backup generation, improved power quality, or both. The Commission should investigate ways to encourage the development of this market as a means for achieving appropriate reliability, where to the extent practicable, a customer is allowed to select — and pay for — her desired level of reliability. Finally, the Commission may require new reliability metrics to determine whether incremental reliability activities meet a cost-benefit test. However, such metrics are most likely to be useful when comparing performance within the system of a single utility.

Respectfully Submitted,

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